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Status and prospects of mackerel and tuna fishery in Bangladesh

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Abstract
Present status and future prospects of mackerel and tuna fisheries in Bangladesh were assessed during July 2003-June 2004. The work concentrated on the fishing gears, length of fishes, total landings and market price of the catch and highlighted the prospects of the fishery in Bangladesh. Four commercially important species of mackerels and tuna *viz.* *Scomberomorus guttatus*, *Scomberomorus commerson*, *Rastrelliger kanagurta*, and *Euthynnus affinis* were included in the study. About 95% of mackerels and tuna were caught by drift gill nets and the rest were caught by long lines (4%) and marine set-bag-net (1%). Average monthly total landing of mackerels and tunas was about 264 t, of which 147 t landed in Cox's Bazar and 117 t in Chittagong sites. Total catches of the four species in Cox's Bazar and Chittagong sites were found to be 956 and 762 t, respectively. The poor landing was observed during January-February and the peak landing was in November and July. Gross market value of the annual landing of mackerels and tunas (1,718 t) was found to be 1,392 lakh taka. Nevertheless, the mackerel and tuna fisheries in Bangladesh are increasingly contributing to the marine fish production of the country and have very good potential for further expansion for both domestic and export market.

Key words: Mackerel, Tuna, Bay of Bengal

Introduction

Mackerels and tunas are dominant groups of pelagic fish that belongs to the family Scombridae. This family includes a total of 54 known species world-wide (Collette and Nauen 1983, Lockwood 1988, World IQ 2004, Froese and Pauly 2004) of which 10 species are available within the EEZ of Bangladesh (Khan *et al.* 1997, BFRI/MFTS 2003). However, only four species are significantly exploited commercially. These are *Scomberomorus guttatus* (the Indo-Pacific King Mackerel, locally known as Maittya), *Scomberomorus commerson* (the Narrow Barred Spanish Mackerel, locally known as Rocket/Surma Maittya), *Rastrelliger kanagurta* (the Indian Mackerel, locally known as Chapa Maittya) and *Euthynnus affinis* (the Eastern Little Tuna, locally known as Bom Maittya). These four species are caught mainly by drift gillnet and longline in

Bangladesh. About 50% of the body weight could be obtained as meat by filleting, compare to 20-30% in most freshwater fishes, so, their market demand in Bangladesh as fresh fish is increasing day by day (BFRI/MFTS 2003).

Although, the fish groups are very important, very little work has been done so far on their biology and fishery in Bangladesh except some fragmentary studies on population dynamics (Mustafa *et al.* 1996, Rashid 2000) and reporting on the presence of the species (Khan *et al.* 1997). However, considerable works on the biology and fishery have been done in the Indo-Pacific region (Lockwood 1988, James and Pillai 1994, Yesaki 1994). The status of mackerels and tuna fisheries in India and their present stock structure have been reviewed critically in the recent past by several workers ((Devaraj 1977, Bal and Rao 1990, Devaraj *et al.* 1994, Srinivasarengan *et al.* 1994). Nevertheless, this study was conducted exclusively on the artisanal commercial fishery of the important species of mackerels and tuna in the marine waters of the country. The study concentrated on the fishing gears, length of fishes, total landings and market price of the catch and highlighted the prospects of the fishery in Bangladesh.

Materials and methods

The two most important coastal fish landing sites, *viz* Cox's Bazar and Chittagong were selected as the sampling stations. Commercially exploited species of mackerels and tunas *viz. Scomberomorus guttatus*, *Scomberomorus commerson*, *Rastrelliger kanagurta*, and *Euthynnus affinis* were selected for data collection. Data collections were conducted in three consecutive days in every 10 days, which covered nine days in a month. On each of the sampling days, types of fishing gears, total landings (kg), average length (TL in cm) and wholesale market prices for three important mackerels and one tuna species were recorded. Approximate proportion of selected mackerels and tuna caught by different gears were also recorded.

Average total daily catch for a particular month was raised to monthly and then annual total catch for each of the species. Average daily catch was estimated using the following formulas:

$$D_c = \{\sum (tc_1 + tc_2 + tc_3)\}/n$$

where,

D_c = Average daily catch (t)
tc_1 = Total catch (t) during the first three (n_1) sampling days
tc_2 = Total catch (t) during the second three (n_2) sampling days
tc_3 = Total catch (t) during the third three (n_3) sampling days
$n = n_1 + n_2 + n_3$

The seasonal variations of catches and percentage contributions of all species were also assessed. The size range, average size and 95% confidence limits of the size were calculated (TL in cm) for each month for each species. Finally, the price range, average price and total annual values of the catch of each of the species were estimated.

Results

Fishing methods

About 95% of the three mackerels and one tuna species were found to be caught by drift gill nets and the rest of the amounts were caught by long lines (4%) and marine set-bag-net (1%) (Fig. 1). Most of the catches were obtained as by-catch of hilsa using drift gill nets. However, sometimes, especially when hilsa catch was very low, the mackerels and tuna were harvested as the target species. Very little variations were observed in the fishing methods among the three species of mackerels and one species tuna (Fig. 1).

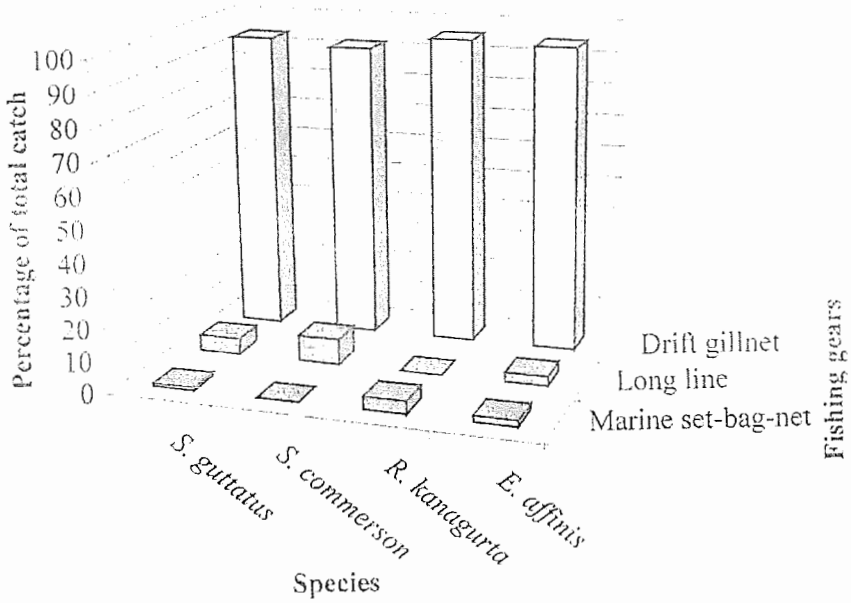

Fig. 1. Approximate percentage of mackerels and tuna caught by different gears during July 2003-June 2004 in marine waters of Bangladesh.

Catch and landings

Monthly total catches during July 2003-June 2004 of three mackerels and one tuna species in Cox's Bazar and Chittagong sites are presented in Table 1. From the table, it is revealed that the average monthly total catch of mackerels and tuna was about 264 t, of which 147 t landed in Cox's Bazar and 117 t landed in Chittagong sites. Among the four species, *S. guttatus* was the highest contributor in both the sites. The species contributed about 589 t in Cox's Bazar and 487 t in Chittagong. The second highest contributor was *E. affinis*, which contributed about 311 t in Cox's Bazar and 229 t in Chittagong. The lowest amount contributed by *S. commerson* in both the sites. The combined total catches of the three species of mackerels and one species of tuna in Cox's Bazar and Chittagong sites were found to be 956 and 762 t, respectively (Table 1).

Table 1. Monthly total catch (in tones) of mackerels and tuna during July 2003-June 2004 in marine waters of Bangladesh

Species	Aug	Sep	Oct	Nov	Dec	Jan-04	Feb	Mar	Apr	May	June	Total	Average	% Comp.
Cox's Bazar														
S. guttatus	52.3	48.7	75.5	82.1	29.5	3.2	3.5	44.2	54.3	55.6	65.3	589.0	90.6	63.0
S. commerson	2.1	2.2	1.8	4.5	1.9	0.8	0.6	2.8	1.9	0.8	1.3	23.5	3.6	1.0
R. kanagurta	2.6	2.8	3.3	3.8	2.2	2.2	2.3	1.9	1.6	3.4	3.8	31.8	4.9	3.0
E. affinis	47.8	9.6	12.2	51.8	33.6	0.8	1.5	47.4	35.2	10.5	10.8	310.9	47.8	33.0
Sub-Total	104.8	63.3	92.8	142.2	67.2	8.0	7.9	96.3	93	70.3	81.2	956.2	147.1	100.0
Chittagong														
S. guttatus	42.6	38.8	65.3	68.7	27.5	4.4	5.2	33.5	41.1	43.2	51.3	487.4	75.0	64.0
S. commerson	2.1	2.1	1.8	3.2	1.7	0.7	0.6	2.1	1.5	0.7	1.2	20.2	3.1	3.0
R. kanagurta	2.2	2.2	2.9	3.2	1.6	1.3	1.8	0.9	0.8	2.9	3.3	25.6	3.9	3.0
E. affinis	21.2	9.8	10.2	45.5	29.5	1.0	1.1	35.2	28.8	8.7	9.8	228.5	35.2	30.0
Sub-Total	68.1	52.9	80.2	120.6	60.3	7.4	8.7	71.7	72.2	55.5	65.6	761.7	117.2	100.0
Total	172.9	116.2	173	262.8	127.5	15.4	16.6	168	165.2	125.8	146.8	1717.9	264.3	

Analysis of the seasonal variations of the catches of mackerels and tunas in the marine waters of Bangladesh showed some variations among seasons (Table 1). The lean season was observed during January-February and the peak in November and July. Moderate catches were observed in the remaining months of the year (Table 1).

Species wise percentage compositions of the catches of three mackerels and one tuna showed that *S. guttatus*, the most dominant contributor, contributed 63% and 64% of the total catches in Cox's Bazar and Chittagong, respectively (Table 1). The second highest contribution (30-33%) was obtained from *E. affinis*. Other two species contributed only about 1-3% each in both the sites (Table 1).

Size range of the fish

The size range together with the monthly average size with 95% confidence level of the three mackerels and one tuna species caught during July 2003-June 2004 from the marine waters of Bangladesh are presented in Fig. 2. From the figure, it is revealed that the smallest and largest members among the four studied species were *R. kanagurta* and *S. commerson*, respectively. The total length varied between 19.8 and 25.1 cm with an average of 23.0±3.4 cm for *R. kanagurta*. The values were 48.1 and 74.2 with an average of 56.6±6.5 cm for *S. commerson* indicating fairly large size of the species. The average total lengths of *S. guttatus* and *E. affinis* were 39.4±5.3 and 40.1±6.4 cm, respectively (Fig. 2).

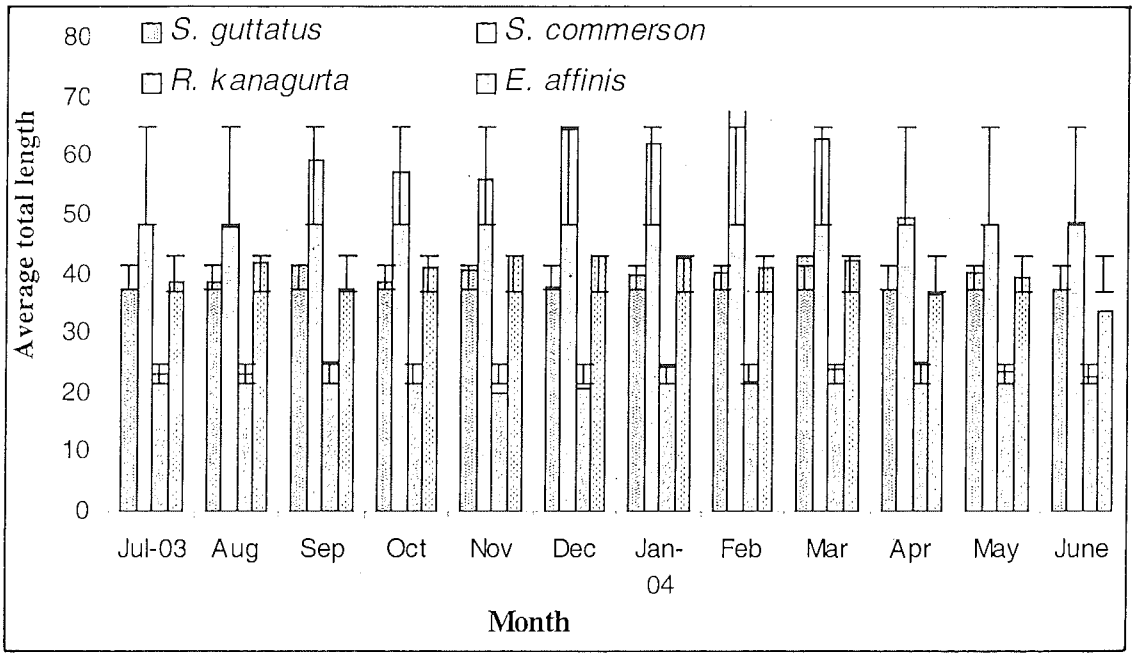

Fig. 2. Monthly average total length (cm) with 95% confidence limits of mackerels and tuna during July 2003-June 2004 in marine water of Bangladesh.

Market price of the catch

The wholesale price range (Tk./kg) together with the monthly average price of the four species of mackerels and tunas marketed during July 2003-June 2004 in Bangladesh are presented in Table 2. From the table, it is revealed that the lowest and highest market prices were obtained during June-September and November-March for all the four species. *S. commerson* was found as the most expensive with an average market price of 104 Tk./kg. The average market price of *S. guttatus* (Tk. 99/kg) was moderate. The remaining two species were found to be fairly cheap, market price of which varied between 40 and 60 Tk./kg (Table 2). Total estimated market value of the total annual catches of the four species were found to be 1,392 lakh taka (Table 2).

Table 2. Monthly average market price and total values of mackerels and tuna during July 2003-June 2004 in marine waters of Bangladesh

Month	Species wise average market price (Tk./kg)				Total
	S. guttatus	*S. commerson*	*R. kanagurta*	*E. affinis*	
Jul-03	90	95	45	40	
Aug	90	95	45	40	
Sep	90	95	45	40	
Oct	90	95	50	45	
Nov	110	120	55	45	
Dec	110	120	60	55	
Jan-04	110	120	60	55	
Feb	110	120	60	55	
Mar	100	100	55	50	
Apr	100	100	50	50	
May	95	95	45	45	
June	90	95	45	45	
Price range	90-110	95-120	45-60	40-55	
Average price	99	104	51	47	
Annual catch (t)	1076	44	58	540	1718
Total value (Lakh Tk.)	1063	46	30	254	1392

Discussion

The results obtained in this study could not be sufficiently compared due to the lack of past work exclusively on mackerels and tunas in Bangladesh. However, some information available in Bangladesh and in India would be mentioned whenever possible.

The main fishing method found in this study was drift gillnet, but in India purse seine as well as drift gillnets (Bal and Rao 1990) were the two most important gears. In

Bangladesh, as obtained in this study, *S. guttatus* was the most important contributor among the mackerels and tuna followed by *E. affinis, R. kanagurta* and *S. commerson.* However, in India, *R. kanagurta* was the most important contributor among the mackerels and tunas followed by *E. affinis, S. guttatus, S. commerson,* and *S. lineolatus* (CMFRI 1999, Bal and Rao 1990). Use of different fishing methods and differences in the abundance of different species in different areas might be the reasons of the variations. In Bangladesh, introduction of fishing with purse seine, mid-water trawl, as well as hook and line may increase the catch and landings of mackerels and tunas significantly. Recent initiatives of the Department of Fisheries to allow mid-water trawl to harvest pelagic fisheries resources may result higher catches of mackerels and tunas in Bangladesh.

The largest size (Fig. 2) together with highest price (Table 2) of the narrow barred Spanish mackerel (*S. commerson*) indicates very high potential of the species in domestic and export market. However, more efforts are necessary to increase the catch of the species using large meshed gillnets, hook and line and mid-water trawl nets.

In general, the three mackerels and one tuna species commercially harvested in Bangladesh mostly remains close to the shoreline, which facilitates to catch easily by the artisanal fishers using drift gill net. More and more fishers are diverting their efforts from the hilsa fishery to the mackerel and tuna fishery, especially due to the recent remarkable reduction of hilsa catch in Bangladesh (Rahman 2001). However, there are six more commercially important species of the groups indicating further potential of the expansion of the fishery from shallower region to the deeper region of the EEZ of Bangladesh. The species are *Katsuwonus pelamis* (Skipjak tuna), *Thunnus maccoyii* (Southern bluefin tuna), *Thunnus obesus* (Bigeye tuna), *Thunnus tonggol* (Longtail tuna), *Auxis rochei* (Bullet tuna) and *Auxis thazard* (Frigate tuna) (Khan *et al.* 1997). Total annual catch of the three mackerels and one tuna species was 1,718 t, which worth about 1,392 lakh taka. This annual contribution of mackerels and tuna could be increased many fold, if six other members of the group could be harvested properly.

Therefore, the mackerel and tuna fishery are increasingly contributing to the marine fish production of the country and have glorious potential for further expansion for both domestic and export market. Nonetheless, due to the moderate market price but high quality flesh content, vast majority of the low-income coastal population are increasingly including the species in their diets, significantly contributing to the reduction of malnutrition to the poorest of the poor people of Bangladesh.

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